

SPE Saudi Arabia Section Technical Symposium and Exhibition 2012

**Al-Khobar, Saudi Arabia
8-11 April 2012**

ISBN: 978-1-63266-711-3

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2012) by the Society of Petroleum Engineers
All rights reserved.

Printed by Curran Associates, Inc. (2014)

For permission requests, please contact the Society of Petroleum Engineers
at the address below.

Society of Petroleum Engineers
P. O. Box 833836
Richardson, Texas 75083-3836

Phone: (800) 456-6863
Fax: (972) 952-9435

books@spe.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

Advanced Fluid Technologies for Tight Gas Reservoir Stimulation	1
<i>Tianping Huang, David E. Clark</i>	
Anisotropy and True Formation Resistivity Measurements with a New LWD Resistivity Sensor	9
<i>Michael Bittar, Hsu-Hsiang Wu, Shanjun Li, Mohammed Bayrakdar</i>	
Application of a Newly Developed Workflow to Design and Optimize MRC and Smart Well Completions	16
<i>S. Shenawi, W. Hidayat, M. Shammari, K. Nasser, A. Faleh, U. Nahdi, Y. Ghurwaidi, N. Mekki</i>	
Application of Latest Generation Inflow Control Devices in Non-Horizontal Wells in India, Case Study	26
<i>Tim McKenzie, Andrew Wenk, Chetan Chavan, Sanjay Kumar, Parvez Khan, Gonzalo Garcia</i>	
Application of Multivariate Methods to Optimize Development of Thin Oil Zones in a Mature Carbonate Reservoir	47
<i>Majid H. Al-Otaibi, D. Brett Fischbuch, Obai Taibah, Ali H. Al-Julaih</i>	
Aqueous Foams Stabilized with Particles and Surfactants	61
<i>Zhaomin Li, Zupeng Liu, Binfei Li, Songyan Li, Qian Sun, Shuhua Wang</i>	
Carbon Dioxide Sequestration: Modeling the Diffusive and Convective Transport under a CO₂ Cap	70
<i>Rabecca Allen, Shuyu Sun</i>	
A Case Study for the Application of Type Curves for Production Data Analysis of Shale Gas Wells with Linear Dual Porosity Behavior	85
<i>Haider J. Abdulal, Stig Lyngra, Robert A. Wattenbarger</i>	
Casing Drilling Technology Application: Case Histories from Saudi Arabia	91
<i>Jude Chima, Shaohua Zhou, Ali-Al-Hajji, Mike Okot, Qamar J. Sharif, David Clark, Dale Oveson, Eric Moellendick, Calvin Holt, Dietmar Neidhardt</i>	
CO₂ Injection into Oil Reservoir Associated with Structural Deformation	109
<i>M. F. El-Amin, A. Negara, A. Salama, K. Bao, S. Sun</i>	
Coil Tubing Fill Cleanout Implemented on Plugged Stand Alone Screens: Highly Successful Campaign in Saudi Arabian Gas Producers	123
<i>Murtadha J. Altammar, Khalid S. Asiri, Saad M. Al-Drweesh, Mohammed A. Asiri</i>	
Coiled Tubing Best Practices in Conjunction with Multistage Completions in the Tight Gas Fields of Saudi Arabia	135
<i>Mohammed Al-Ghazal, Justin Tate Abel, Muhammad Al-Buali, Azmi Al-Ruwaihed, Abdulaziz Al-Saqr, Saad Al-Drweesh, Stuart Wilson</i>	
Combining The Micro Grain Imager With The Effective Medium Theory For Quick Assessment Of The Absolute Permeability In Carbonates	148
<i>Mustapha Abbad</i>	
Comparisons and Contrasts of Shale Gas and Tight Gas Developments, North American Experience and Trends	159
<i>Robert L. Kennedy, William N. Knecht, Daniel T. Georgi</i>	
Correlations Between NMR Relaxation Response And Relative Permeability From Tomographic Reservoir Rock Images	186
<i>Tariq M. Alghamdi, C. H. Ams, R. Y. Eyvazzadeh</i>	
Dependency of Remaining Oil Saturation on Wettability and Capillary Number	201
<i>Kumuduni Prasangka Abeyasinghe, Ingebret Fjelde, Arild Lohne</i>	
Detecting and Managing Inter-reservoir Communication Between Two Stacked Reservoirs	213
<i>Nawaf I. Sayedakram, Abdulaziz S. Tubayyeb, Joseph Ansah, Sultan S. Shamrani</i>	
Development of Low Permeability Reservoir Utilizing Multi-stage Fracture Completion in the Minimum Stress Direction	221
<i>Mahbub Ahmed, Zillur Rahim, Hamoud Al-Anazi, Adnan Al-Kanaan, Mohammed Mohiuddin</i>	
Early Injectivity Test Helps To Understand Reservoir Performance and Connectivity	229
<i>Majid H. Otaibi, E. J. Pinilla, C. H. Pardo, Meshari D. Alodah</i>	
Effect of Acid Gas on Cement Sheath Integrity: Experimental Findings	246
<i>Andre Garnier, Jean Benoit Laudet, Sandip Patil, Rahul Patil, Kris Ravi, Luis Ferreira</i>	
Electrical Response of a Vuggy Rock Model at Different Frequencies	256
<i>F. Pairoys, A. Al-Zoukani, A. Keskin, M. Akbar</i>	
Enhanced Oil Recovery Using Nanoparticles	276
<i>N. A. Ogolo, O. A. Olafuyi, M. O. Onyekonwu</i>	

Environmentally Acceptable Emulsion System: An Effective Approach for Removal of Asphaltene Deposits	285
<i>Lalit Salgaonkar, Achala Danait</i>	
Estimating Horizontal Well PI to Develop Giant Carbonate Reservoir with Artificial Lift	291
<i>Majid Al-Otaibi, Cesar H. Pardo, Ronny Gunarto, Mohammed Kanfar</i>	
Estimating Layers Deliverability in Multi-Layered Gas Reservoirs Using Artificial Intelligence	298
<i>M. K. Alarfaj, A. Abdulraheem, A. Al-Majed, E. Hossain</i>	
Exploring and Evaluating Eastern Hemisphere Proppants in Fracturing Applications	309
<i>Ramya Kothamasu, Prasanta Das, Prasad Karadkar</i>	
First Successful Deployment of a Cost-Effective Chemical Plug to Stimulate Selectively Using CT in Saudi Arabia Gas Fields - A Case History	319
<i>Mohammed Al-Ghazal, Justin T. Abel, Ali Al-Saihati, Muhammad Buali, Azmi Al-Ruwaihed, Jose R. Vielma, Ernesto Bustamante</i>	
Forecasting and Monitoring Water Cut Utilizing ESP Pump Discharge Pressures and Fluid PVT Analysis	327
<i>Sultan M. Al Enezi, Mickey L. Warlick, Muzher I. Almusabeh, Abdullah A. Kaba</i>	
Heavy Oil Viscosity Measurements; Accuracy, Reliability, and Repeatability	339
<i>Hassan Alkandari, Osamah Alomair, Adel Elsharkawy</i>	
High Power Laser Application in Openhole Multiple Fracturing with an Overview of Laser Research; Past, Present and Future	347
<i>Sameeh I. Batarseh, Hazim H. Abass, Abdulrahman A. Al-Mulhelm, Nabeel S. Habib</i>	
How Advances in Technology Can Help Safely Abandon Off-Shore Subsea Wells	357
<i>Richard Segura, Mohammed A. Haq</i>	
Identifying New Opportunities in a Mature Reservoir: Wara Formation, Wafra Field, Saudi Arabia/ Kuwait Partitioned Zone	365
<i>Cristina Masarik, Ramon Gonzalez-Mieres, Farhan Jamil, John Buza</i>	
Improved Model for Predicting the Required Minimum Gas Injection Rate for Removal of Cutting during Underbalanced Drilling	386
<i>Fadairo Adesina Samson, Ako Churchill, Nwaokete Emmanuel, Falode Olugbenga</i>	
Improved Technology Enhances Gas Production and Decreases Cost In Underbalanced Drilling While Using Coiled Tubing Directional Drilling	399
<i>Kashif Ahmed, Cliff Kirby, Alasdair Law, Malik Al-Humood</i>	
Improved Understanding of Proppant-Formation Interactions for Sustaining Fracture Conductivity	405
<i>Neelam Rayson, Jim Weaver</i>	
Innovative Technique to Liven Dead Wells with a Rigless Gas Lift System	424
<i>Ahmed Sunbul, Steve Barlow, Mohammed Khalifa, Jeremias Hernandez, Sadeh Zamka</i>	
Integral Pod Intake for Electrical Submersible Pumps	432
<i>Mark K. Rooks, Kristopher Snyder, Lyle Wilson, James Fleming, John Mack, Matt Wisniewski</i>	
Integrating Optimized Casing Exit and Solid Expandable Technologies: Bringing New Life to Dead Wells	440
<i>Tom Sanders, Cliff Hogg, Pat York, Franz Tompek</i>	
Interpretation of Well Test Data from Two Hydraulically Communicating Reservoirs	449
<i>B. Al Quaimi, K. Aminian, S. Ameri</i>	
Inversion in the Transient Temperature Behavior in the Intervals of Oil and Water Inflow: Theory and Technique for Application	459
<i>Ayrat Ramazanov, Rim Valiullin</i>	
Laboratory Scale Control of Drilling Parameters to Enhance Rate of Penetration and Reduce Drill String Vibration	470
<i>Abdolali Esmaeilli, Behzad Elahifar, Rudolf K. Fruhwirth, Gerhard Thonhauser</i>	
Molecular Design Synthesis and Simulation on a Novel Gemini Surfactant for EOR From Low Permeability Reservoirs	479
<i>Heng Wei</i>	
A New, Low Corrosive Fluid to Stimulate Wells with Carbon Steel Tubular and Internals	481
<i>H. A. Nasr-El-Din, C. A. De Worf, A. Bouwman, E. R. A. Bang, E. Naylor, A. Alex</i>	
A New Practical Approach to Evaluate Near Wellbore Formation Damage Parameters Based on Well Test Analysis for Gas Reservoir	488
<i>Melvin Kome, M. M. Amro, M. M. Hossain</i>	
A New Viscoelastic Surfactant for High Temperature Carbonate Acidizing	509
<i>Guanqun Wang, Hisham A. Nasr-El-Din, Jian Zhou, Stuart Holt</i>	
Optimization of Downhole Sand Screens by Lab Studies in Multiple Gas Fields	527
<i>Mahed N. Al-Rabeh, Khalid S. Al-Mohanna</i>	
Petrophysical Properties of a Synthetic Model Rock for Validation of Micro-CT Based Calculation	534
<i>Ismail Mohammed, Steve Adewole, Olalekan Olafuyi</i>	

Powering Through a Lateral Junction for ERC Wells - Is It Really a Step Too Far?	543
<i>Brett Bouldin, Chandresh Verma, Steve Dyer, Parvesh Singh, Thales Oliveira</i>	
Precise Approach to Isolate Fractured Water Bearing Lower Zone in Complex Saudi Arabian Gas Well by Placing Ceramic Proppant and Cement in Restricted Depth Utilizing HPCT to Withstand High Bottom-hole Pressure during Fracturing Treatment in the Upper Zone: A Case History	560
<i>Ataur R. Malik, Jorge E. Duarte, Hamad F. Kulaib, Mohammed A. Atwi, Eduardo Vejarano, Riefky Abdurrahman</i>	
Preparation and Characterization of Colloidal Gas Aphron based Drilling Fluids Using a Plant-based Surfactant	569
<i>M. Arabloo Nareh'Ei, M. Pordel Shahri, M. Zamani</i>	
A Pressure Transient Approach for Dynamic Characterization of a Giant Carbonate Middle Eastern Oil Field	582
<i>Rodolfo J. Phillips Guerrero, Stig Lyngra, Saud A. Binakresh, Danang R. Widjaja, Ahmed H. Alhuthali</i>	
A Procedure for Measuring Contact Angles When Surfactants Reduce the Interfacial Tension and Cause Oil Droplets to Spread	588
<i>O. O. Adejare, R. A. Nasralla, H. A. Nasr-El-Din</i>	
Production Enhancement Using a Multiphase Helico-Axial Pump in a Remote Hilly-Terrain Oil Field in Saudi Arabia	599
<i>Zulkifli B. Samsudin, Shaleh M. Ajmi, Dia S. Qudaihy, Fiasal M. Dossary, Alaa Gharaibeh, Jostein Tvedt</i>	
Quality Control/Quality Assurance Assessments of Core Analysis Data from Multiple Commercial Laboratories	605
<i>Maclean O. Amabeoku, Rami H. Binnasser</i>	
Real-Time Database Inventory Model, KPI and Applications for Intelligent Fields	617
<i>Farooq A. Khan, Hamad Muhawes</i>	
A Review of Recent Developments and Challenges in Shale Gas Recovery	621
<i>O. Arogundade, M. Sohrabi</i>	
Simultaneous Determination of Capillary Pressure and Relative Permeabilities	652
<i>Muhammad R. Hashmet, Isa M. Tan, Saeed Majidaei, Muhammad Mushtaq</i>	
State-of-the-Art Openhole Shale Gas Logging	663
<i>Javier A. Franquet, Matt W. Bratovich, Richard D. Glass</i>	
A Step Change in Fishing Efficiency: Recovering Stuck Pipe Using the Fishing Agitation Tool	675
<i>Assaad Mohanna, Mark Vogheli, Aref Alali, Rami Bakir, Ahmad Al-Mousa</i>	
Stimulation Strategies to Guard against Uncertainties of Carbonate Reservoirs	683
<i>Tomislav Bukovac, M. Gurmen Nihat, Jairo Leal Jauregui, Ataur R. Malik, Simeon Bolarinwa, Fadel Al-Ghurairi</i>	
Streamline Simulation Technology: Evolution and Recent Trends	696
<i>A. A. Al-Najem, S. Siddiqui, M. Soliman, B. Yuen</i>	
Stress Superposition Explains Fracture Patterns in some Middle East Oil Fields	718
<i>Sait Ismail Ozkaya</i>	
Stuck Pipe Best Practices - A Challenging Approach to Reducing Stuck Pipe Costs	756
<i>Muhammad A. Muqem, Alexander E. Weekse, Ali A. Al-Hajji</i>	
Stuck-Pipe Prevention Solutions in Deep Gas Drilling; New Approaches	766
<i>Julio M. Guzman, Mohamed E. Khalil, Nicolas Orban, Mohammed Ahmed Mohiuddin, Jaywant Verma, Sukesh Ganda</i>	
Tar Characterization for Optimum Reservoir Management Strategy	775
<i>Muhammad Al-Harhi, Mohammed Al-Ali, Ronny Gunarto</i>	
Technologies for Monitoring Matrix Oil Saturation for TA-GOGD	784
<i>John Edwards, Ahmed Hammami, Nate Bachman, Edmund Fordham, Mark Flaum, Gossen, Bakker, Solenn Bettembourg, Pristiwanto Putra, Keith Rawnsley</i>	
Transient Pressure Analysis of Gas Wells in Unconventional Reservoirs	798
<i>Yu Shu Wu, Cong Wang, Didier Ding</i>	
Upstream Data Standards at Saudi Aramco	811
<i>M. A. Alshehry, M. M. Al-Khudiri, F. S. Al-Sanie, R. A. Miyajan, A. A. Altaiban, A. S. Al-Zawawi, M. S. Khakwani</i>	
Using Histogram Equalization and Edge Detection to Enhance Stratigraphic	818
<i>Khalid Al Gami, Ahmed Al. Ghamdi</i>	
Water Injection Optimization Using Streamlines from a Finite-Difference Simulator: A Case Study of a Middle East Field	824
<i>Mohammed S. Raslan, Ahmad J. Sultan</i>	
Well Optimization Strategies in Conventional Reservoirs	833
<i>Ghazi Alqahtani, Ravi Vadapalli, Shameem Siddiqui, Srimoyee Bhattacharya</i>	
Wellbore Remediation using Microemulsion Technology to Increase Hydrocarbon Productivity	846
<i>Qusai A. Darugar, Lirio Quintero, Thomas A. Jones, Gianna Pietrangeli</i>	
Author Index	